longer. Its peculiarly thickened, subtruncate columella is rather unique.

A NEW FLORIDAN *CYCLOSTREMA*

BY H. A. PILSBRY

Cyclostrema sanibelense, new species. Pl. 8, fig. 3.

The low-turbinate shell is narrowly umbilicate, the base impressed, somewhat funnel-like around the perforation; whitish, slightly translucent. There are about 3½ rounded whorls. The early whorls are smooth, sculpture beginning on the penult whorl. The last whorl has seven narrow spiral cords separated by much wider intervals, which are crossed by very delicate, rather widely spaced threads in the direction of lines of growth. The moderately oblique aperture is rounded, the contour a little flattened by contact with the preceding whorl. Outer and basal margins are thin, the upper margin arching forward. Columella thickened, continuous with the short, adnate parietal callus. Sometimes a few weak, fine spirals can be seen within the umbilical cavity of the base. The operculum is corneous, multispiral, similar to that of *Calliostoma*.

Height 0.8 mm., diam. 1.0 mm.
Height 0.9 mm., diam. 1.1 mm.

It is apparently near *Cyclostrema granulum* Dall from Samana Bay, Santo Domingo, but it has fewer spiral cords and is more depressed, the *C. granulum* being as high as wide.

This is one of the smallest Florida gastropods known, but the series of more than sixty specimens collected on several occasions shows that they are adult shells.

Collected at Sanibel, Florida, on valves of living *Atrina* (Dr. Louise M. Perry).

ON THE LIFE HABITS OF SOME TROPICAL FRESH-WATER MUSSELS

BY FRITZ HAAS

1. *Existence of fresh-water mussels in highly polluted water*

On February 16, 1938, I had an opportunity of collecting in the Lagõa da Felipa in NE. Brazil, State of Ceará. The basin named

above belongs to Rio Bunubuiu, a left tributary of Rio Jaguaribe; it is a flat pan with a marly bottom which receives its water by means of a connecting canal from Rio Bunubuiu, when the latter carries high water, and it retains this water during the whole year, though, of course, with heavy losses. Its marly bottom does not encourage a rich aquatic flora and this may be the reason why no mollusks of the families of the Lymnaeids, Planorbids, Physids, Ancylids and Sphaeriids were seen.

I found the water of the Lagõa da Felipa heavily polluted by the dung of cattle and donkeys; in the rather long part of the shore which I studied the water was literally converted into dung-water, the leached particles of the donkeys' dung floating near the edge or lying on the shore as flood-drift. There was, therefore, but little hope of finding a rich molluscan fauna in the lagoon, and indeed I succeeded in collecting in the marly mud, about 7 inches deep, only the following species:

Ampullarius (*Ampullarius*) *figulinus* (Spix).
Anodontites (*Anodontites*) *obtusus* (Spix).
Anodontites (*Anodontites*) *trapesialis darochai* W. B. Marshall.
Anodontites (*Anodontites*) *crispatus salmoneus* W. B. Marshall.
Mycetopoda siliquosa (Spix).

The many organic substances dissolved in the water of the lagoon must have made it practically free of oxygen. We, therefore, may imagine that the Ampullarians, with their secondary lung, can stand the anaerobic conditions of their habitat; but it is difficult to understand how the Mutelids can live there. But the fact mentioned above is by no means unique, for the detection of living fresh-water mussels in water heavily polluted by dung in the Brazilian Lagõa da Felipa is supported by corresponding observations in South Africa, where I found living specimens of *Aspatharia* (*Spathopsis*) *wahlbergi* (Krauss) in the last residual pools of rivers and brooks, the water of which was reduced to veritable dung-water by the dung of antelopes and zebras coming to quench their thirst there in the evenings (Haas, Abh. Senck. Nat. Ges., Nr. 431, p. 95; 1936).

Both in Africa and in South America, these observations refer to Mutelid mussels only; can it be that these are more resistant than Unionids? We can only guess at the reasons which enable mussels to live under such unfavorable conditions.

Perhaps the undeniable property of many mussels, specially those that live in fresh water, to nourish themselves at least partly by means of adsorption—that is, by taking in through the surface of their body and by digesting materials dissolved in the water—can explain why dung-water almost free of oxygen does not suffocate the mussels living in it; for the organic matter contained in the water may be adsorbed by the animals, and the oxygen freed by its decomposition during digestion may be used for respiration.

This ideology is supported by Cole's statement (Journ. Exp. Zool., 33; 1921) that animals living in water containing no dissoluted oxygen develop an oxydase in their tissues, mainly in their crystalline stile.

2. *Estivation in fresh-water mussels*

On March 3, 1938, I collected in the Dam of Umarizeira, 30 miles southwest of Fortaleza, State of Ceará, NE. Brazil, where, as I had learned, fresh-water mussels or "itans," as they are called in the vernacular language of the people, had already been found. The man who was to help me, however, refused to go into the water as I had done; he repeated to me again and again that "the itans are living in the dry earth at the margin of the water."

While I was looking for living shells in the water, the man worked in the sandy-earthy ground just near to me, where there were tomatoes growing, cutting up a layer about 2 inches thick; and there he really found, after a while, a living mussel, an *Anodontites* (*Anodontites*) *crispatus salmoneus* W. B. Marshall, about three-fourths grown. So, though no more species were obtained, it was proved that in quite dry earth, 10–15 inches above the water level for more than 6 months of the year, fresh-water mussels of the genus *Anodontites* can endure dryness and can live for half a year or still longer out of water, imbedded in dry, stone-like bottom. In order to characterize this bottom, I may mention that we found, together with the mussel, an eel, *Symbranchus marmoratus* Bloch estivating too, and a living chrysalis of a moth of the Sphingid family. Is there need of more evidences to prove that the ground in which the above-mentioned living mussel was found, must have been absolutely dry?

More corroborating facts about the estivation of mussels in dry ground were obtained in other dams of the Fortaleza region.

One must not believe, however, that *all* the mussels in a pond or a dam can endure summer dryness out of water and in dried-out ground at the margin, which is laid bare when the water begins to shrink in consequence of the heat. For only those which have been surprised by the retreating water and which could not follow it toward the center of the basin will bury themselves in the ground, while the rest of the mussels, living at greater depths, remain in the water throughout the entire summer.

Similar resistance to dryness on the part of fresh-water mussels has been described only once, to the best of my knowledge. Deshayes (N. Arch. Mus. Paris, 10; 1874) mentions that a specimen of *Pilsbryoconcha*, that is to say, an anodontine Unionid, sent to Paris from Cambodia by the then long way around the Cape of Good Hope, could be brought back to life by being placed in water.

TWO NEW POLYGYROID HELICOIDS FROM NORTHERN CALIFORNIA

BY S. STILLMAN BERRY
Redlands, California

The seed of future doubt and confusion must ever be implicit in the description and naming of a species, and more especially a subspecies from our western states, bearing no better locality data than the citation of a county, for the western counties are often very large and ofttimes one of them will be found inhabited by a whole series of closely related forms difficult to discriminate with any surety without the most precise information. For example it appears that at least three distinguishable races of the *columbiana-megasoma* group of Polygyroid snails occur within the limits of Humboldt County, California. *P. c. megasoma* was described from this county without specific locale, and it remains in other respects somewhat inadequately known. If I do not go astray in my interpretation of it, the two races described below are receptive candidates for new names.

1) MESODON (*megasoma*, subsp.?) ERITRICHIUS nov. Fig. 1 B, C.

DESCRIPTION: Shell small, low-conic, rather thin; base tumid.